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| 10/826,389 | 04/19/2004 | Takayuki Shimne | 43888-312 | 9712 |

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| EXAMINER | |
|---|---|
| CANTELMO, GREGG | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1745 | |

DATE MAILED: 03/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/826,389 | SHIRANE ET AL. | |
| | Examiner | Art Unit | |
| | Gregg Cantelmo | 1745 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *07 January 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-3 and 5-14* is/are pending in the application.

4a) Of the above claim(s) *10-14* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Amendment*

1. In response to the amendment received January 7, 2005:

a. Claims 1-3 and 5-14 are pending. Claim 4 has been cancelled as per Applicant's request;

b. The objection to the abstract has been overcome and withdrawn in light of the newly filed abstract;

c. The prior art rejections of record are withdrawn in light of the amendment.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 10-14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitation of the battery case comprising an inwardly extending bottom is held to be new matter. While Applicant refers to Fig. 5 as evidence of support, Fig. 5 shows a planar bottom that is neither inwardly nor outwardly extending. The disclosure states that the bottom 205 of the battery case has a through hole 213 in the bottom of the battery case (see paragraph [0105]). Therefore

this limitation as defined in claim 10 is not held to have adequate support in the original disclosure.

3. Claims 1-3 and 5-9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 1-9 recite that the end portions are both parallel to the lengthwise direction thereof, exposing the core (i.e., reference character 202c) and that the end portion is also bent to form a bent portion (212). If the end portion is bent then the end portion is no longer parallel to the lengthwise direction as required by claims 1 and 9. Thus it would be unclear how to arrive at the claimed configuration since the end portion is not disclosed as being parallel and bent as recited in the instant claim

Claims 1 and 9 should be amended to recite an "...exposed portion parallel ..." and thereafter, "... said exposed portion including an end portion ...", to overcome this rejection. The claims have been interpreted in this manner for the purpose of application of prior art rejections.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 09-063630-A (JP '630) in view of JP 2002-170547 A (JP '547).

JP '630 discloses of a secondary battery comprising an electrode group, an electrolyte a battery case for accommodating therein said electrode group and said electrolyte and a current collector plate positioned at the bottom of said battery case, wherein said electrode group is formed by winding a positive electrode and a negative separator, electrode with the interposition of a separator, said positive electrode comprises a belt-shaped positive electrode core and a positive electrode material mixture carried on said positive electrode core, said negative electrode comprises a belt-shaped negative electrode core and a negative electrode material mixture carried on said negative electrode core, at least one of said positive electrode and said negative electrode has an end portion parallel to the lengthwise direction thereof exposing said core, said end portion positioned at an end face of said electrode group is directly connected to said current collector plate, and at least part of said current collector plate is exposed outside at the bottom of said battery case (Fig. 3 as applied to claim 1).

One of the current collector plates 15A serves as the bottom of the battery (Fig. 3 as applied to claim 2).

The current collector 15A is connected to the positive electrode and is made of aluminum (translated paragraph [0045] as applied to claim 7).

The electrolyte comprises a non-aqueous solvent and a solute dissolved in the solvent (paragraph [0018] and paragraph [0038] as applied to claim 8).

JP '630 discloses of a secondary battery comprising an electrode group, an electrolyte a battery case for accommodating therein said electrode group and said electrolyte and a current collector plate positioned at the bottom of said battery case, wherein said electrode group is formed by winding a positive electrode and a negative electrode with the interposition of a separator, said positive electrode comprises a belt-shaped positive electrode core and a positive electrode material mixture carried on said positive electrode core, said negative electrode comprises a belt-shaped negative electrode core and a negative electrode material mixture carried on said negative electrode core, said positive electrode has an end portion A parallel to the lengthwise direction exposing the positive electrode core, said negative electrode has an end portion B parallel to the lengthwise direction exposing the negative electrode core, said end portions positioned at opposing ends of the electrode group and connected to opposing collector plates 15A and 15B with said current collector plates exposed outside the bottom of the battery case (Fig. 3 as applied to claim 9).

The difference between claims 1 and 9 and JP '630 is that JP '630 does not teach of the end portion of each electrode group being bent to form a bent portion with the bent portion directly connected to the current collector plate.

JP '547 discloses of exposed portions parallel to the lengthwise direction thereof exposing the core and of bending the edges of exposed portions of the electrodes in a wound cell and connecting the bent portions to a respective current collector (abstract and Figs. 2, 3, 4 and 5).

The motivation for providing the bent portion of the electrodes and connecting the bent portions directly to respective current collectors is to improve the contact surface area between the electrodes and current collector thereby improving current collection within the cells.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '630 by providing the bent portion of the electrodes and connecting the bent portions directly to respective current collectors as taught by JP '547 since it would have improved the contact surface area between the electrodes and current collector and thus improved current collection within the cells.

***Response to Arguments***

5. Applicant's arguments with respect to claims 1, 2 and 7-9 have been considered but are moot in view of the new ground(s) of rejection.

***Claim Rejections - 35 USC § 103***

6. Claims 1, 2 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 09-312161-A (JP '161) in view of JP 2002-170547 A (JP '547).

JP '161 discloses of a secondary battery comprising an electrode group, an electrolyte a battery case 10 for accommodating therein said electrode group and said electrolyte, and a current collector plate positioned at the bottom of said battery case, wherein said electrode group is formed by winding a positive electrode and a negative separator, electrode with the interposition of a separator, said positive electrode comprises a belt-shaped positive electrode core and a positive electrode material

mixture carried on said positive electrode core, said negative electrode comprises a belt-shaped negative electrode core and a negative electrode material mixture carried on said negative electrode core, at least one of said positive electrode and said negative electrode has an end portion parallel to the lengthwise direction thereof exposing said core, said end portion positioned at an end face of said electrode group is directly connected to said current collector plate, and at least part of said current collector plate is exposed outside at the bottom of said battery case (Fig. 1 as applied to claim 1).

Each collector plate 11 and 12 severs as the bottom of the battery case (Fig. 1 as applied to claim 2).

The positive current collector 12 is aluminum (paragraph [0024] as applied to claim 7).

The electrolyte comprises a non-aqueous solvent and solute (paragraph [0015 as applied to claim 8).

JP '161 discloses of a secondary battery comprising an electrode group, an electrolyte a battery case for accommodating therein said electrode group and said electrolyte and a current collector plate positioned at the bottom of said battery case, wherein said electrode group is formed by winding a positive electrode and a negative electrode with the interposition of a separator, said positive electrode comprises a belt-shaped positive electrode core and a positive electrode material mixture carried on said positive electrode core, said negative electrode comprises a belt-shaped negative electrode core and a negative electrode material mixture carried on said negative

electrode core, said positive electrode has an end portion A parallel to the lengthwise direction exposing the positive electrode core, said negative electrode has an end portion B parallel to the lengthwise direction exposing the negative electrode core, said end portions positioned at opposing ends of the electrode group and connected to opposing collector plates 12 and 11 with said current collector plates exposed outside the bottom of the battery case (Fig. 1 as applied to claim 9).

The difference between claims 1 and 9 and JP '161 is that JP '161 does not teach of the end portion of each electrode group being bent to form a bent portion with the bent portion directly connected to the current collector plate.

JP '547 discloses of exposed portions parallel to the lengthwise direction thereof exposing the core and of bending the edges of exposed portions of the electrodes in a wound cell and connecting the bent portions to a respective current collector (abstract and Figs. 2, 3, 4 and 5).

The motivation for providing the bent portion of the electrodes and connecting the bent portions directly to respective current collectors is to improve the contact surface area between the electrodes and current collector thereby improving current collection within the cells.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '161 by providing the bent portion of the electrodes and connecting the bent portions directly to respective current collectors as taught by JP '547 since it would have improved the contact surface

area between the electrodes and current collector and thus improved current collection within the cells.

***Response to Arguments***

7. Applicant's arguments with respect to claims 1, 2 and 7-9 have been considered but are moot in view of the new ground(s) of rejection.

***Claim Rejections - 35 USC § 103***

8. Claims 1-3, 6 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 09-306442-A (JP '442) in view of JP 2002-170547 A (JP '547).

JP '442 discloses of a secondary battery comprising an electrode group, an electrolyte a battery case 2 for accommodating therein said electrode group and said electrolyte, and a current collector plate 5 positioned at the bottom of said battery case 2, wherein said electrode group is formed by winding a positive electrode and a negative separator, electrode with the interposition of a separator, said positive electrode comprises a belt-shaped positive electrode core and a positive electrode material mixture carried on said positive electrode core, said negative electrode comprises a belt-shaped negative electrode core and a negative electrode material mixture carried on said negative electrode core, at least one of said positive electrode and said negative electrode has an end portion parallel to the lengthwise direction thereof exposing said core, said end portion positioned at an end face of said electrode group is directly connected to said current collector plate 5, and at least part of said current collector 5 plate is exposed outside at the bottom of said battery case (Figs. 1, 2 and 4 as applied to claim 1).

Collector plate 5 severs as the bottom of the battery case (Figs. 1, 2 and 4 as applied to claim 2).

The collector plate serves to close the bottom of the case 2 and is welded to the case (Figs. 2 and 4 and abstract as applied to claim 3).

The collector plate is made of nickel (abstract) and is connected to the negative electrodes (abstract and Figs. 2 and 4 as applied to claim 6).

The electrolyte comprises a non-aqueous solvent and solute (paragraph [0015 as applied to claim 8).

JP '442 discloses of a secondary battery comprising an electrode group, an electrolyte a battery case 2 for accommodating therein said electrode group and said electrolyte and a current collector plate 5 positioned at the bottom of said battery case, wherein said electrode group is formed by winding a positive electrode and a negative electrode with the interposition of a separator, said positive electrode comprises a belt-shaped positive electrode core and a positive electrode material mixture carried on said positive electrode core, said negative electrode comprises a belt-shaped negative electrode core and a negative electrode material mixture carried on said negative electrode core, said positive electrode has an end portion A parallel to the lengthwise direction exposing the positive electrode core, said negative electrode has an end portion B parallel to the lengthwise direction exposing the negative electrode core, said end portion positioned at opposing ends of the electrode group and connected to collector plate 5 with said current collector plate exposed outside the bottom of the battery case (Figs. 1, 2 and 4 as applied to claim 9).

The difference between claims 1 and 9 and JP '442 is that JP '442 does not teach of the end portion of each electrode group being bent to form a bent portion with the bent portion directly connected to the current collector plate.

JP '547 discloses of exposed portions parallel to the lengthwise direction thereof exposing the core and of bending the edges of exposed portions of the electrodes in a wound cell and connecting the bent portions to a respective current collector (abstract and Figs. 2, 3, 4 and 5).

The motivation for providing the bent portion of the electrodes and connecting the bent portions directly to respective current collectors is to improve the contact surface area between the electrodes and current collector thereby improving current collection within the cells.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '442 by providing the bent portion of the electrodes and connecting the bent portions directly to respective current collectors as taught by JP '547 since it would have improved the contact surface area between the electrodes and current collector and thus improved current collection within the cells.

***Response to Arguments***

9. Applicant's arguments with respect to claims 1-3, 6 and 8-9 have been considered but are moot in view of the new ground(s) of rejection.

***Claim Rejections - 35 USC § 103***

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '630 or JP '442 in view of JP '547 as applied to claim 1 above and in further view of U.S. patent No. 4,332,867 (Tsuda).

The teachings of JP '442 and JP '547 have been discussed above and are incorporated herein.

The difference between claim 5 and JP '442 is that JP '442 does not expressly define the thickness of the collector plate.

According to Tsuda, the thickness of the current collector is also one of factors that affect the welding efficiency. However, according to the present invention, where each of the positive and negative current collectors 21 and 22 is made of nickel or nickel-plated steel, the current collector having a thickness up to 0.5 mm can be employed satisfactorily. If the thickness is larger than 0.5 mm., the red-hot state can hardly be established at that portion of the current collector bound by the welding electrodes because of the reduced electric resistance and also of the increased heat capacity. In addition, the larger the thickness of the current collector, the more rigid the current collector, and accordingly, there is difficulty in welding the portion of the current collector to each turn of the edge portion of the corresponding positive or negative plate. Although this possibility can be avoided if the current collector of the increased thickness is pressed against the edge portion of the corresponding positive or negative plate by the application of a pressure during the welding operation, the application of the pressure will adversely results in fall-down or folding of some of the turns of the edge portion of the corresponding positive or negative plate, which fall-down brings about

short-circuiting between one turn of the edge portion of the positive plate and the adjacent turn of the edge portion of the negative plate (paragraph bridging columns 7 and 8).

The motivation for providing a current collector having a thickness of up to 0.5 mm is that it provides a collector configuration having sufficient welding capability.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '442 by configuring the thickness of the collector plate to be up to 0.5 mm since it would have provided a collector which has sufficient welding capability for welding of the plate to the case.

***Response to Arguments***

11. Applicant's arguments with respect to claims 5 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (571) 272-1283. The examiner can normally be reached on Monday to Thursday from 9 a.m. to 6 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. FAXES received after 4 p.m. will not be processed until the following business day. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gregg Cantelmo
Primary Examiner
Art Unit 1745

gc

March 14, 2005